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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/586,115	06/02/2000	Rodolfo Milito	P3807	6216

24739 7590 07/31/2002

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EXAMINER
HIRL, JOSEPH P

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 07/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/586,115	MILITO ET AL.	
	Examiner	Art Unit	
	Joseph P. Hirl	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1 - 23 are pending in this application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claim 1 – 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lakshman et al (ACM 1-58113-003, referred to as **Lakshman**).

Claim 1

Lakshman anticipates a first set of rules associating to the packets by values of the header fields (**Lakshman**, page 203, col 2, lines 29 – 35); and a classification system for selecting specific rules in the set of rules as applicable to a specific packet (**Lakshman**, page 203, col 2, lines 29 – 35); characterized in that the classification system projects the first set of rules as N-dimensional entities on N axes in N-dimensional space, marking the beginning and ending value on each axis for each rule as a breakpoint, numbers intervals between breakpoints in sequential binary numbers, associates a subset of the first set of rules as applicable in each interval between breakpoints on each axis, then considers a packet as a point in the N-dimensional space according to its header field values, locates the binary numbered interval into which the point projects on each axis by performing a search on each axis for the numbered interval into which the point projects on that axis, thereby determining rules applicable to the packet for that axis, and then determines the specific rules applicable

to the packet from the subsets of rules by selecting those rules as applicable to the packet that apply to the packet on all of the N axes (**Lakshman**, page 208, col 2, lines 10 – 34; Examiner's Note: a set of breakpoints constitutes an interval).

Claims 2, 13

Lakshman anticipates the search performed on each axis is a binary search conducted by selecting breakpoints at which the bits change for the binary numbered intervals (**Lakshman**, page 209, col 2, lines 59 – 62).

Claims 3, 14

Lakshman anticipates the search performed on each axis is a quatenary or higher-level M-ary search, where M is a power of 2, conducted by selecting breakpoints at which the bits change for the binary numbered intervals (**Lakshman**, page 209, col 2, lines 59 – 62; Examiner's Note: quatenary is a looped binary search which has rule depth limits).

Claims 4, 15

Lakshman anticipates association of applicable rules in each numbered interval is made by associating a binary string with each interval, with one bit dedicated to each rule. (**Lakshman**, page 208, col 2, lines 10 – 34).

Claims 5, 16

Lakshman anticipates the rules are associated to bit positions in the binary string by priority, the order of priority according to bit significance, and a final rule is selected by the most significant 1 in the matching rules. (**Lakshman**, page 208, col 2, lines 10 – 34).

Claims 6, 17

Lakshman anticipates the applicable rules are found by ANDing the binary strings determined for each axis over all axes. (**Lakshman**, page 208, col 2, lines 10 – 34).

Claims 7, 18

Lakshman anticipates at least one hardware pipeline for conducting the search on an axis, the pipeline comprising first, second, and sequential modules for accomplishing increasingly particular portions of the search, wherein, after the first module of the sequential modules is used, determined values from the first module pass to the second module, and values for a second packet enter the pipeline at the first module, the pipeline operations proceeding thus sequentially. (**Lakshman**, page 208, col 2, lines 36 – 39; page 209, col 1, lines 1 – 26).

Claims 8, 19

Lakshman anticipates parallel pipelines with one pipeline dedicated to searching on each axis in the N-dimensional space, wherein searches are conducted for applicable intervals simultaneously on each axis. (**Lakshman**, page 208, col 2, lines 36 – 39; page 209; col 1, lines 1 – 26).

Claims 9, 20

Lakshman anticipates applicable rules for each interval on each axis are represented by individual bitmaps, with each rule assigned a bit position, and wherein the outputs of the parallel pipelines, being the numbered interval on each axis into which the point for a packet projects, are exchanged for the associated bitmaps, which

are then ANDed to determine the applicable rules. (**Lakshman**, page 208, col 2, lines 36 – 39; page 209; col 1, lines 1 – 26; page 208, col 2, lines 10 – 34).

Claims 10, 21

Lakshman anticipates searching is interleaved, results of searching on one or more axes being applied to other axes before searching on the other axes. (**Lakshman**, page 207, col 2, lines 55 – 57; Examiner's Note: Lakshman, using the best method related to the development of the system of Claim 1, extracts the jth element of every filter for all n filter rules where such element's reference must exceed one on the jth axis. In the conventional mathematical notation, if i is less than 1 or not defined, the respective jth axis has no value for the referenced rule. Since there must be an ith value for each rule in the jth dimension, Lakshman's algorithm anticipates an efficient search. The mathematical converse applicable to Lakshman's notation sets aside the rule covering the instance wherein the rule does not have an interval on one or more k axes.)

Claims 11, 22

Lakshman anticipates rules that are found by search to not apply on one or more axes are not considered in searches conducted on the other axes (**Lakshman**, page 207, col 2, lines 55 – 57; see above notation).

Claim 12

Lakshman anticipates projecting the rules as N-dimensional entities on N axes in dimensional space (**Lakshman**, page 207, col 2, lines 55 – 60); marking the beginning and ending value on each axis for each rule as a breakpoint (**Lakshman**, page 208, col

1, lines 7 – 10); numbering intervals on each ,axis sequentially with binary numbers; identifying those breakpoints at which bits in the interval numbers change (**Lakshman**, page 208, col 2, lines 10 – 34); associating a subset of the rules as applicable in each interval on each axis (**Lakshman**, page 208, col 2, lines 10 – 34); considering a packet as a point in the N-dimensional space according to values of the header fields for the packet (**Lakshman**, page 203, col 2, lines 29 – 35); determining by search the binary numbered interval on each axis into which the packet point projects (**Lakshman**, page 203, col 2, lines 29 – 35; page 208, col 2, lines 10 – 34); substituting the subset of rules that apply for each determined interval (**Lakshman**, page 208, col 2, lines 10 – 34); and selecting those rules as applicable to the packet that associate to the packet on all of the N axes (**Lakshman**, page 208, col 2, lines 10 – 34).

Claim 23

Lakshman anticipates conducting a first search on one or more axes (**Lakshman**, page 209, col 2, lines 56 – 62); and using information from the first search to simplify further searching on remaining axes (**Lakshman**, page 203, col 2, lines 19 – 25)

Conclusion

3. Claims 1 – 23 are rejected.

Correspondence Information

Any inquiry concerning this information or related to the subject disclosure

should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Thomas G. Black can be reached at (703) 305-9707. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

(703) 746-7240 (for informal or draft communications with notation of "Proposed" or "Draft").

Hand-delivered responses should be brought to:

Receptionist,

Crystal Park II,

2121 Crystal Drive,

Arlington, Virginia.

THOMAS BLACK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

Joseph P. Hirl

July 15, 2002